(No Model.)

L. KRAMER.

HYDRAULIC ELEVATOR.

No. 603,566. Patented May 3, 1898.

Fig. I.

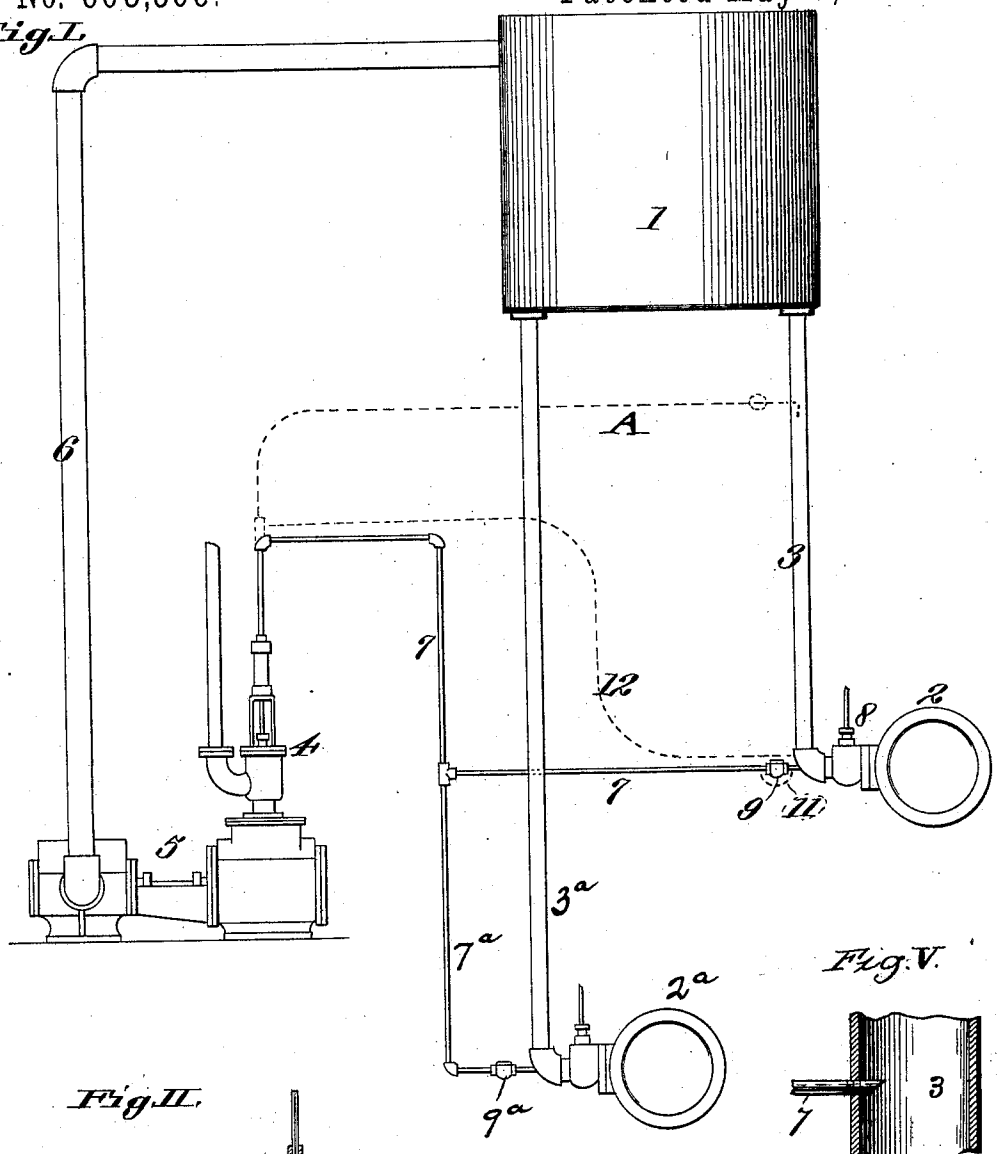


Fig. V.

Fig. II.

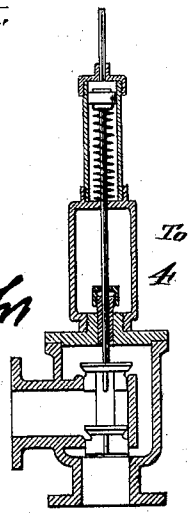


Fig. III.

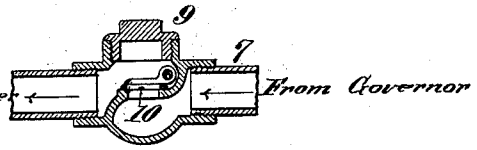
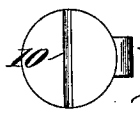


Fig. IV.



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UNITED STATES PATENT OFFICE.

LOUIS KRAMER, OF ST. LOUIS, MISSOURI.

HYDRAULIC ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 603,566, dated May 3, 1898.

Application filed May 3, 1897. Serial No. 634,885. (No model.)

To all whom it may concern:

Be it known that I, LOUIS KRAMER, a citizen of the United States, residing in the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Hydraulic Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

It is customary to provide a pipe located between the pump-governor and the storage tank or reservoir that supplies the elevator-cylinders for the purpose of causing the pump to be started and stopped as the elevator is started and stopped, the pump being thus controlled by the column of water in the tank, the governor acting to allow the throttle-valve to open when the pressure in the tank is reduced below a certain point as the elevator is running and acting again to close the valve after the pressure in the tank rises above a certain point when the elevator stops. The action of the governor with this arrangement does not occur promptly with the starting and stopping of the elevator, as is desirable, and to obviate this difficulty is the object of my invention.

My invention consists in features of novelty hereinafter fully described, and pointed out in the claims.

Figure I is an elevation or side view illustrating my invention. Fig. II is an enlarged vertical section of the pump-governor and throttle-valve. Fig. III is an enlarged vertical section of one of the check-valves. Fig. IV is a bottom view of the valve proper removed from its housing. Fig. V is an enlarged detail view.

Referring to the drawings, 1 represents the storage-tank, 2 the hoisting-cylinder, 3 the pipe connecting the tank to the cylinder, 4 the pump-governor, 5 the pump, and 6 the supply-pipe leading from the pump to the tank, all of which are common and well known.

7 represents a pipe which heretofore, as stated, has been employed to form a connection between the pump-governor and the tank by being attached directly to the tank. I have discovered that if this pipe is connected to the pipe 3 instead of to the tank the governor will respond promptly to the starting and stopping of the elevator. I prefer to connect the pipe 7 to the pipe 3 close up to the valve 8, that is controlled from the cab of the elevator, so that as soon as the valve 8 opens a communication between the pipe 3 and the relatively much larger cylinder 2 the pressure in the pipe 7 will be at once released and the governor will act promptly, allowing the pump to start at almost the instant the elevator starts. Instead, however, of connecting the pipe 7 to the pipe 3 at the valve 8 the connection may be higher up on the pipe 3, as shown by dotted line A, Fig. I, in which case I prefer to bend the end of the pipe 7 downwardly within the pipe 3 or to bevel its end, as shown in Fig. V, so that the water in passing through the pipe 3 when the valve 8 is opened will create a suction in the pipe 7, thus taking the pressure from the governor and allowing the pump to act as soon as the valve 8 is opened.

It will be observed from the foregoing that the governor will be allowed to open promptly upon the opening of the valve 8 by the cab-operator, and it is desirable that the governor shall operate as promptly to close the throttle-valve when the valve 8 is closed by the cab-operator. To effect this, I provide the check-valve 9, located in the pipe 7, with a recess or groove 10, (see Figs. III and IV,) forming a port or passage-way in the valve, through which water passes back from the pipe 3 to the pump-governor when the valve 8 is closed, this groove providing for a flow of water to the governor after the valve 8 is closed, permitting the governor to close the throttle-valve as soon as the valve 8 is closed.

In lieu of forming a groove in the check-valve a by-pass 11 around the valve may be employed, or a separate pipe 12, as shown by dotted lines, Fig. I, may be employed.

Any number of hoisting-cylinders may be connected to the tank 1, and in the drawings I have shown a second cylinder 2^a, connected to the tank by a pipe 3^a, corresponding to the pipe 3. This additional cylinder has a pipe 7^a, corresponding to the pipe 7 and which may connect to the pipe 7, as shown, instead of extending all the way to the governor. The pipe 7^a is provided with a check-valve 9^a, corresponding to the valve 9. The object of the check-valves, aside from their ports or pas-

sages 10, is to prevent a strong flow of water passing from the tank-pipe 3 3^a of one cylinder through the governor-pipe 7 7^a of the other cylinder when the water is turned onto the other cylinder—as, for instance, if the check-valve 9^a was not provided a strong flow of water would pass from pipe 3^a to pipe 7 when the valve 8 of cylinder 2 was opened and thus prevent pipe 7 from performing its function of releasing the governor. Another function of the check-valve is that they prevent the too sudden or severe action of the governor in closing the throttle-valve, for while this wants to be quick it does not want to be severe.

I am aware that it is old in an automatic air-brake to employ a governor located in a pipe that forms a communication between the train-pipe and the pump for the purpose of automatically stopping the pump when the pressure in the main reservoir or train-pipe reaches a certain point, and I make no claim to such a construction.

I claim as my invention—

1. In a hydraulic elevator, the combination of a storage-tank, a hoisting-cylinder, a pump provided with a governor, a pipe forming a connection between the tank and the hoisting-cylinder, and a pipe forming a connection between the pump-governor and said tank-pipe and provided with a check-valve, means for applying the fluid-pressure in the tank or tank-pipe to the governor to stop the pump when the desired pressure is reached, substantially as set forth.

2. In a hydraulic elevator, the combination of a storage-tank, a hoisting-cylinder, a pipe forming a connection between the storage-tank and the hoisting-cylinder, a pump provided with a governor, a pipe forming a connection between the pump-governor and said tank-pipe, and a check-valve in the last-mentioned pipe; said pump-governor pipe connecting with said tank-pipe in close proximity to the valve that controls the passage of water from the latter pipe to the hoisting-cylinder, means for applying the fluid-pressure in the tank or tank-pipe to the governor when the desired pressure is reached, substantially as set forth.

3. In a hydraulic elevator, the combination of a storage-tank, hoisting-cylinders, pipes forming connections between said tank and cylinders, a pump provided with a governor, pipes forming connections between said pump-governor and said tank-pipes, and check-valves provided with grooves or passages 10 and located in said governor-pipes, substantially as set forth.

LOUIS KRAMER.

In presence of—
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